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Tetsuro Inui

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EXAMINER

WOLDEKIDAN, HIBRET ASNAKE

ART UNIT

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2613

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/624,082	Applicant(s) INUI ET AL.	
	Examiner Hibret A. Woldekidan	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Response to Arguments

1. Examiner acknowledges receipt of Applicant's amendments, remarks, arguments received on 12/11/2008. Claims 1-19 have been amended. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 101

Claims 1-11 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, titled "Clarification of 'Processes' under 35 U.S.C. 101"). The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

In independent Claim 1, the method steps of "...extracting..." and "...monitoring..." are not tied to any apparatus. Similarly in independent claim 5, the method steps of "...measuring...", "...providing..." are not tied to any apparatus.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A Person shall be entitled to a patent unless-

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

1. Claims 1,2,4-7,11-15 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Frankel et al. (6,980,738).

Considering claim 1 Frankel discloses a method of monitoring a dispersion on a transmission optical fiber in a wavelength division multiplexing optical transmission system (**See Col. 3 lines 20-50,fig. 1,2,6 i.e. monitoring and compensating dispersion in a wdm optical transmission system(10)**) in which a transmission distance is fixed (**any optical fiber has a specific transmission distance**) and the dispersion of the transmission optical fiber has a slope that changes with respect to temperature changes(**See Col. 4 line 63- Col. 5 line 7,fig. 3 i.e. as illustrated in fig. 3 a dispersion slope of the optical transmission system changes from TA to F+TA**

Art Unit: 2613

with respect to temperature changes. As further illustrated in fig. 1, the transmission medium of the optical transmission system(10) is optical fiber(16)), said method comprising the steps of: extracting two or more of wavelength channels 1 to n from the transmission optical fiber(See Col. 3 lines 33-37,fig. 1 i.e. a 1:N de-multiplexer(20) for extracting 1-n wavelength channels); and monitoring dispersions of the extracted wavelength channels(See Col. 6 lines 23-31 i.e. optical receivers(22) for monitoring signal quality of the extracted signals from the de-multiplexing unit(20)).

Considering claim 2 Frankel discloses the method according to claim 1, wherein the step of monitoring the dispersions comprises the steps of: measuring a first dispersion value in the extracted wavelength channels 1 to n (wavelength: λ_{mon1} to λ_{monn}) at a certain temperature $T_1(^{\circ}\text{C})$ (**See Col. 4 line 44 - Col. 5 line 7,fig. 3 i.e. As illustrated in fig. 3, determining the first dispersion DA in wavelength λ_1 - λ_n at a certain temperature**); measuring a second dispersion value in the wavelength channels 1 to n at a certain other temperature $T_2(^{\circ}\text{C})$ (**See Col. 4 line 44 - Col. 5 line 7,fig. 3 i.e. As illustrated in fig. 3, determining the second dispersion DB in wavelength λ_1 - λ_n at a certain temperature**); providing dispersion variation amounts ΔD_{mon1} to ΔD_{monn} in the extracted wavelength channels 1 to n from a difference between the measured first dispersion value and the measured second dispersion value (**See Col. 4 line 63- Col. 5 line 7, Col. 5 lines 19-25,fig. 3 i.e. as illustrated in fig. 3 providing dispersion change amount(ΔD) in a given wavelength**); and providing a dispersion variation amount at an arbitrary wavelength (λ) based on the provided

Art Unit: 2613

dispersion variation amounts ΔD_{mon1} to ΔD_{monn} **(See Col. 5 lines 1-25, fig. 3 i.e. providing dispersion variation amount(ΔD) for arbitrary wavelength).**

Considering claim 4 Frankel discloses the method according to Claim 1, wherein the step of monitoring the dispersions comprises the steps of:

measuring a first dispersion value in a desired wavelength channel at a certain temperature T_1 ($^{\circ}\text{C}$) **(See Col. 4 line 44 - Col. 5 line 7, fig. 3 i.e. As illustrated in fig. 3, determining the first dispersion DA in wavelength λ_1 - λ_n at a certain temperature)**; measuring a second dispersion value in the desired wavelength channel at a certain other temperature T_2 ($^{\circ}\text{C}$) **(See Col. 4 line 44 - Col. 5 line 7, fig. 3 i.e. As illustrated in fig. 3, determining the second dispersion DB in wavelength λ_1 - λ_n at a certain temperature)**; and providing a dispersion variation amount in the desired wavelength channel from a difference between the measured first dispersion and the measured second dispersion value **(See Col. 5 lines 1-25, fig. 3 i.e. providing dispersion variation amount(ΔD) for arbitrary wavelength based on the difference of the first and the second dispersion amount).**

Considering claim 5 Frankel discloses a method of compensating a temperature dependency of a dispersion slope in a wavelength division multiplexing optical transmission system **(See Col. 3 lines 20-50, fig. 1,2,6 i.e. monitoring and compensating dispersion in a wdm optical transmission system(10))** in which a transmission distance is fixed **(any optical fiber has a specific transmission distance)** and the dispersion slope of a transmission optical fiber changes with respect to temperature changes **(See Col. 4 line 63- Col. 5 line 7, fig. 3 i.e. as illustrated in**

Art Unit: 2613

fig. 3 a dispersion slope of the optical transmission system changes from TA to F+TA with respect to temperature changes. As further illustrated in fig. 1, the transmission medium of the optical transmission system(10) is optical fiber(16)), said method comprising the steps of: providing the dispersion variation amount $\Delta D(\lambda)$ by the method according to any one of Claims 2 to 4(See Col. 4 line 63- Col. 5 line 7, Col. 5 lines 19-25,fig. 3 i.e. as illustrated in fig. 3 providing dispersion change amount(ΔD) in a given wavelength); and compensating the temperature dependency of the dispersion slope by using the provided dispersion variation amount $\Delta D(\lambda)$ (See Col. 4 line 63- Col. 5 line 7, Col. 5 lines 19-39,fig. 3 i.e. as illustrated in fig. 3 compensating the dispersion change to have a net zero dispersion as illustrated by graph F+TA).

Considering claim 6 Frankel discloses the method according to Claim 5, wherein the step of compensating the temperature dependency of the dispersion slope comprises the steps of: dividing a signal light on the transmission optical fiber to one or more wavelength channel groups constituted by at least one wavelength channel(See Col. 3 lines 33-37,fig. 1 i.e. a 1:N de-multiplexer(20) for dividing the incoming wdm signals into n wavelength channels); and compensating the dispersion in accordance with each of the divided one or more wavelength channel groups(See Col. 6 lines 23-39,fig. 1 i.e. the receivers(22) of the n divided wavelength channels are configured to monitor the signal quality of the incoming channels and based on the detected signal quality, the compensating unit(18) perform appropriate dispersion compensations).

Considering claim 7 Frankel discloses the method according to Claim 5, wherein the step of compensating the temperature dependency of the dispersion slope summarizing compensates a wavelength dependency of the temperature dependency of the dispersion in all of bandwidths in a wavelength division multiplexing optical transmission system(See Col. 4 lines 8-11 and 56-67, fig. 2,3 i.e. **dispersion compensating unit(18) for compensating dispersion in the incoming WDM signals**).

Considering Claim 11 Frankle discloses the method according to Claim 7, wherein the step of compensating the temperature dependency of the dispersion slope comprises the step of: providing a temperature change in a dispersion compensating optical fiber installed at an optical node (See Col. 6 lines 1-7, fig. 1-3, a **dispersion compensator(18 of fig. 1) is installed in optical system(10 of fig. 1). The dispersion compensator(18 of fig. 2) has a thermal regulator(34 of fig. 2) for regulating or providing temperature change**).

Considering claim 12 Frankel discloses a dispersion monitoring apparatus for monitoring a dispersion on an optical fiber in a wavelength division multiplexing optical transmission system(See Col. 3 lines 20-50,fig. 1,2,6 i.e. **monitoring and compensating dispersion in a wdm optical transmission system(10))** in which a transmission distance is fixed (**any optical fiber has a specific transmission distance**) and the dispersion of the transmission optical fiber has a slop that changes with respect to temperature changes(See Col. 4 line 63- Col. 5 line 7,fig. 3 i.e. **as illustrated in fig. 3 a dispersion slope of the optical transmission system changes**

Art Unit: 2613

from TA to F+TA with respect to temperature changes. As further illustrated in fig. 1, the transmission medium of the optical transmission system(10) is optical fiber(16)), said dispersion monitoring apparatus comprising: extracting means for extracting two or more of wavelength channels from the transmission optical fiber (See Col. 3 lines 33-37,fig. 1 i.e. a de-multiplexer(20) for extracting signals); and monitoring means for monitoring dispersions of the extracted wavelength channels(See Col. 6 lines 23-31 i.e. optical receivers(22) for monitoring signal quality of the extracted signals from the de-multiplexing unit(20)).

Considering Claim 13 Frankel discloses a dispersion slope temperature dependency compensating apparatus For compensating a temperature dependency of a dispersion slope in a wavelength division multiplexing optical transmission system (See Col. 3 lines 20-50,fig. 1,2,6 i.e. compensating dispersion in a wdm optical transmission system(10)) in which a transmission distance is fixed (**any optical fiber has a specific transmission distance**) and the dispersion slope of the transmission optical fiber changes with respect to temperature changes(See Col. 4 line 63- Col. 5 line 7,fig. 3 i.e. as illustrated in fig. 3 a dispersion slope change from TA to F+TA with respect to temperature changes. As further illustrated in fig. 1, the transmission medium of the optical transmission system(10) is optical fiber(16)), said dispersion slope temperature dependency compensating apparatus comprising: monitoring means For monitoring dispersions of two or more of wavelength channels on a transmission optical fiber(See Col. 3 lines 33-37,fig. 1 i.e. a de-multiplexer(20) for extracting signals); and

Art Unit: 2613

compensating means for compensating a wavelength dependency of the temperature dependency of the dispersion in an arbitrary wavelength channel by using the monitored dispersions **(See Col. 6 lines 23-31 i.e. optical receivers(22) for monitoring signal quality of the extracted signals from the de-multiplexing unit(20)).**

Considering Claim 14 Frankel discloses the step of compensating the temperature dependency of the dispersion slope according to claim 13, wherein said compensating means comprises the steps of : means for dividing a signal light on the transmission optical fiber to one or more wavelength channel groups constituted by at least one wavelength channel**(See Col. 3 lines 33-37,fig. 1 i.e. a multiplexer(14) for grouping the incoming signal light in a group of channels)**; and means for compensating the dispersion in accordance with each of the divided one or more wavelength channel groups **(See Col. 3 lines 38-45,fig. 1,2 i.e. dispersion compensators(18) for compensating the group of channels received from the multiplexer(14)).**

Considering Claim15 Frankel discloses the dispersion slope temperature dependency compensating apparatus according to Claim 13, wherein said compensating means summarizing compensates the wavelength dependency of the temperature dependency of the dispersion in all of bandwidths in a wavelength division multiplexing optical transmission system**(See Col. 4 lines 8-11 and 56-67, fig. 2,3 i.e. dispersion compensating unit(18) for compensating dispersion in the incoming WDM signals).**

Considering Claims 19 Frankle discloses the dispersion slope temperature dependency compensating apparatus according to claim 15, wherein said compensating means comprises: a dispersion compensating optical fiber installed in an optical node(**See Col. 6 lines 1-7, fig. 2 i.e. installing a dispersion compensating optical fiber(DCF, 32) in a dispersion compensating module(18)**); and means for providing a temperature change to the dispersion compensating optical fiber(**See Col. 6 lines 1-7,fig. 1-3 i.e. providing a temperature change to the dispersion compensating optical fiber(DCF)**)).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 9,17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al. (6,980,738) in view of Ooi et al. (6,925,262)

Considering Claim 9 Frankel discloses the method according to Claim 6, wherein the step of compensating the dispersion is carried out by using one or more tunable dispersion equalizers(See Col. 5 lines 2-7, Fig. 2 i.e. the **compensating means(18) includes one or more tunable dispersion compensating fibers(DCF, 32)**).

Art Unit: 2613

Frankle discusses using filters in dispersion compensation(**See Col. 1 lines 50-55**).

Frankle does not specifically disclose the dispersion compensating unit includes a filter.

Ooi teaches a dispersion compensating unit includes a filter (**See Col. 6 lines 33-37, Fig. 6 i.e. a dispersion compensating unit(42) includes a filtering unit(50)**).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Frankle, and have the compensating unit includes a filter, as taught by Ooi, thus providing an efficient data transmission system by using a filtering unit in a dispersion compensating system for accurately compensate the dispersion loss as required in the system, as discussed by Ooi (**Col. 1 lines 64-67**).

Considering Claim 17 Frankel discloses the dispersion slope temperature dependency compensating apparatus according to Claim 14, wherein said compensating means includes one or more tunable dispersion equalizers (**See Col. 5 lines 2-7, Fig. 2 i.e. the compensating means(18) includes one or more tunable dispersion compensating fibers(DCF, 32)**).

Frankle discusses using filters in dispersion compensation(**See Col. 1 lines 50-55**).

Frankle does not specifically disclose the dispersion compensating unit includes a filter.

Art Unit: 2613

Ooi teaches a dispersion compensating unit includes a filter as discussed in claim 9 **(See Col. 6 lines 33-37, Fig. 6 i.e. a dispersion compensating unit(42) includes a filtering unit(50))**.

3. Claims 8,10,16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al. (6,980,738) in view of Eggleton (6,307,988)

Considering Claim 8 Frankle discloses the method according to Claim 6, wherein the step of compensating the dispersion is carried out by using one or more tunable dispersion equalizers**(See Frankle: Col. 4 line 63-Col. 5 line 7, fig. 2,3 i.e. a compensating means(18) having a tunable dispersion compensating fiber(DCF,32))**.

Frankle further discusses using Bragg gratings in dispersion compensation **(See Col. 1 lines 50-55)**

Frankle does not specifically disclose the dispersion compensating means includes a Bragg grating.

Eggleton teaches the dispersion compensating means includes a fiber Bragg grating **(See Col. 2 lines 31-35, Col. 3 lines 41-48 i.e. a dispersion compensating means(20) include a Bragg grating(33))**.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Frankle, and have the dispersion compensating means includes a Bragg grating, as taught by Eggleton, thus providing an efficient data transmission system by using an automatic dispersion compensating system which is capable of compensating dispersion caused by temperature changes in

Art Unit: 2613

the system without changing basic network parameters, as discussed by Eggleton (**Col. 2 lines 19-22**).

Claim 10 is rejected for the same reason as claim 8.

Considering Claim 16 Frankle discloses the dispersion slope temperature dependency compensating apparatus according to Claim 14, wherein said compensating means includes one or more tunable dispersion equalizers(**See Frankle: Col. 4 line 63-Col. 5 line 7, fig. 2,3 i.e. a compensating means(18) having a tunable dispersion compensating fiber(DCF,32)**).

Frankle further discusses using Bragg gratings in dispersion compensation (**See Col. 1 lines 50-55**)

Frankle does not specifically disclose the dispersion compensating means includes a Bragg grating.

Eggleton teaches the dispersion compensating means includes a fiber Bragg grating as discussed in claim 8 (**See Col. 2 lines 31-35, Col. 3 lines 41-48 i.e. a dispersion compensating means(20) include a Bragg grating(33)**).

Claim 18 is rejected for the same reason as claim 16.

Allowable Subject Matter

Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusions

Art Unit: 2613

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hibret A. Woldekidan whose telephone number is (571)270-5145. The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on 5712723078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. A. W./
Examiner, Art Unit 2613

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613